

WE CLAIM:

1. A method of depositing a film over a surface in a partially fabricated integrated circuit, the method comprising:

exposing the surface to products of a plasma, thereby modifying termination of the surface without significantly affecting bulk properties beneath the surface; and
after modifying the surface termination, depositing a layer thereover using an atomic layer deposition process.

2. The method of Claim 1, wherein the plasma comprises a nitrogen excited species.

3. The method of Claim 1, wherein the surface overlies a semiconductor substrate.

4. The method of Claim 1, wherein the atomic layer deposition comprises depositing an oxide having a higher dielectric constant than silicon nitride.

5. The method of Claim 4, wherein the oxide is selected from the group consisting of aluminum oxide, zirconium oxide, hafnium oxide, barium strontium titanate and strontium bismuth tantalate.

6. The method of Claim 1, wherein exposing incorporates less than 10 atomic % of the products of the plasma at a depth of greater than about 10 Å from the surface.

7. The method of Claim 1, wherein the surface is a gate dielectric surface.

8. The method of Claim 1, wherein the plasma is generated remote from the surface.

9. The method of Claim 1, wherein the atomic layer deposition process comprises a metal oxide deposition.

10. The method of Claim 1, wherein the atomic layer deposition process comprises two reactant pulses with intervening purge pulses in each cycle.

11. A method of depositing a film over a surface in a partially fabricated integrated circuit, the method comprising:

exposing the surface to products of a plasma, thereby modifying termination of the surface without depositing greater than one atomic monolayer of the products of the plasma on the surface; and

after modifying the surface termination, depositing a layer thereover using an atomic layer deposition process.

12. The method of Claim 11, wherein the plasma comprises a nitrogen excited species.

13. The method of Claim 11, wherein the surface is defined by a semiconductor structure.

14. The method of Claim 11, wherein the atomic layer deposition comprises depositing an oxide having a higher dielectric constant than silicon nitride.

15. The method of Claim 14, wherein the oxide is selected from the group consisting of aluminum oxide, zirconium oxide, hafnium oxide, barium strontium titanate and strontium bismuth tantalate.

16. The method of Claim 11, wherein the surface is a gate dielectric surface.

17. The method of Claim 11, wherein the plasma is generated remote from the surface.

18. The method of Claim 11, wherein the atomic layer deposition process comprises a metal oxide deposition.

19. The method of Claim 11, wherein the atomic layer deposition process comprises two reactant pulses with intervening purge pulses in each cycle.